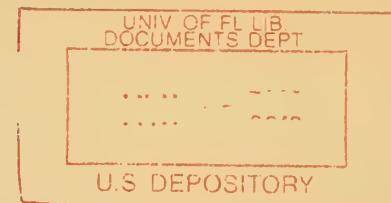


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UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Agricultural Economics



UTILIZATION OF TRACTORS AND COST OF TRACTOR POWER
ON GRAIN FARMS

(Northern Great Plains and Pacific Northwest, 1933)

By R. S. Washburn, Assistant Agricultural Economist,

and

R. S. Kifer, Senior Agricultural Economist

Washington, D. C.
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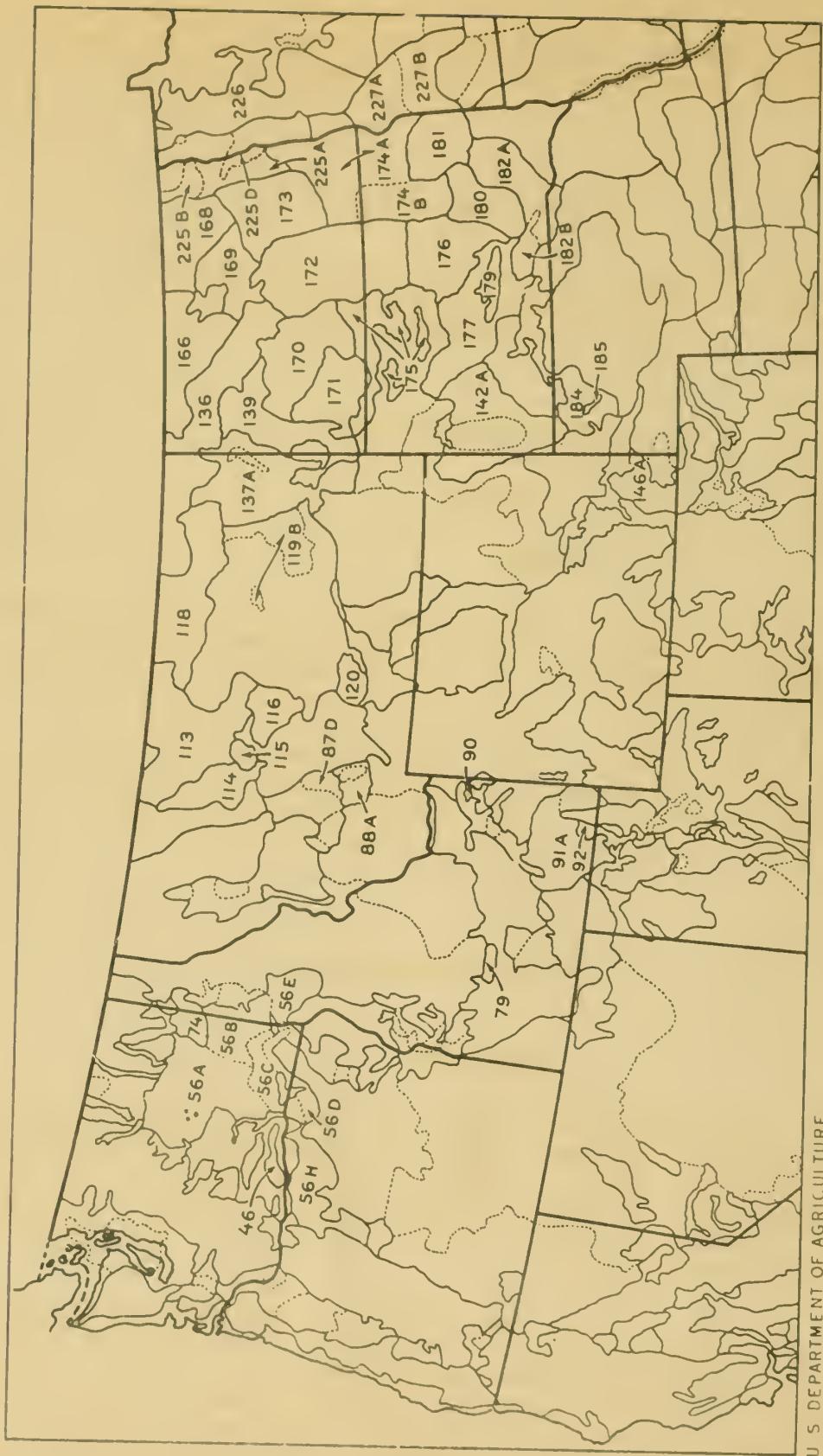
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INTRODUCTION

Successive years of low farm incomes have seriously reduced the resources of many farmers in the spring wheat regions of the Northern Great Plains and of the Pacific Northwest. Because of the need for adjustment in the organization and operation of grain farms in these regions and in the light of changing economic conditions, information with reference to farm organization and farming practice was obtained.

The study was made in April, May, and June of 1934 and, for the most part, applies to the crop year 1933. The field data were obtained by personal interviews with 1,674 farm operators in grain producing areas of the Northern Great Plains and of the Pacific Northwest. The farming areas surveyed, shown in figure 1, are those outlined in United States Department of Commerce, Bureau of the Census Bulletin, "Types of Farming in the United States". The farmers interviewed gave detailed information on the organization and operation of their farms, such as acreage of wheat and other crops grown; a history



of crop yields over a period of years; the practices employed in the production of wheat and other crops; numbers and kinds of livestock; kinds and quantities of livestock products; an inventory of the kinds and quantity of equipment on the farm; the duty of farm machinery and the cost of operating power equipment.

As the study aimed to show the methods of growing and harvesting crops, particularly wheat, the sample of farms may show a larger acreage of wheat and a higher proportion of the land in crops than would a county average. No particular effort was made for any other selection, however, and it is believed that the records obtained are typical of grain farms in the type-of-farming areas studied.

In certain sections of the Northern Great Plains, particularly western North Dakota, eastern Montana, and in many areas of South Dakota, conditions of extreme drought prevailed in 1933. As a result very little harvest was reported in these drought areas and the harvest work done with power equipment was abnormal. The use of equipment in a normal season rather than that reported in 1933 has been used in calculating the cost of operating power equipment.

In many areas the use of large scale power equipment was common and constituted a large part of the farm expense. For this reason a series of reports dealing with farm equipment is being published.

The purpose of the present report is to show the extent to which tractors are used for farm power, the type and size of tractors in use, the kinds of work done and the cost of using tractors on representative farms in the grain-producing sections of the Northern Great Plains and of the Pacific Northwest. The other publications in the machinery series are;

1. Utilization of combined harvester-threshers and cost of harvesting small grains with a combine (Northern Great Plains and Pacific Northwest, 1933).
2. Cost of operating farm motor trucks on grain farms (Northern Great Plains and Pacific Northwest, 1933).
3. Tillage, planting, and harvesting equipment on grain farms and rates of doing field work with these implements when drawn with horse and with tractor power (Northern Great Plains and Pacific Northwest).

NUMBER AND SIZE OF FARMS HAVING TRACTORS AND NUMBER AND SIZE OF FARMS NOT HAVING TRACTORS BY TYPE-OF-FARMING AREAS

Tractors were used in all of the grain-producing areas surveyed in the Northern Great Plains (table 1). They are the chief source of power for field work on many of the larger wheat farms in the more westerly areas. On the smaller general farms in the eastern areas of the region, horses were used for certain kinds of field work and on many of these farms horses were the only source of power for field work. The proportion of farmers using tractors, according to this sample, varied from 25 percent in a general farming

Table 1. - Number and size of farms having tractors and number and size of farms not having tractors, by type-of-farming areas, Northern Great Plains, 1933

State and type-of-farming area	Farms having tractors		Farms not having tractors		All farms	
	Farms studied	Crop area per farm	Farms studied	Crop area per farm	Farms studied	Crop area per farm
	Number	Acres	Number	Acres	Number	Acres
Minnesota	:	:	:	:	:	:
225A	:	29	:	330	:	14
226	:	4	:	308	:	12
225D	:	15	:	373	:	5
227A	:	16	:	276	:	9
227B	:	13	:	251	:	16
North Dakota	:	:	:	:	:	:
225B	:	9	:	506	:	3
173	:	18	:	434	:	16
174A	:	35	:	445	:	17
168	:	26	:	623	:	14
169	:	24	:	579	:	12
172	:	28	:	415	:	27
170	:	25	:	292	:	12
171	:	35	:	497	:	13
136	:	51	:	509	:	19
139	:	16	:	505	:	3
166	:	33	:	552	:	7
South Dakota	:	:	:	:	:	:
181	:	16	:	391	:	16
182A	:	7	:	223	:	20
174B	:	20	:	445	:	11
180	:	16	:	350	:	14
176	:	34	:	649	:	7
179	:	15	:	598	:	4
182B	:	14	:	496	:	12
175	:	21	:	571	:	8
142A-177	:	24	:	473	:	3
Nebraska	:	:	:	:	:	:
184	:	33	:	407	:	14
185	:	20	:	712	:	2
Montana	:	:	:	:	:	:
137A	:	18	:	396	:	16
119B	:	17	:	716	:	6
118	:	22	:	408	:	7
113	:	48	:	740	:	2
114	:	44	:	557	:	2
115	:	26	:	1094	:	-
116	:	36	:	511	:	5
87D	:	8	:	525	:	14
88A	:	24	:	478	:	18
120	:	13	:	662	:	7
Wyoming	:	:	:	:	:	:
146A	:	29	:	690	:	1
Total or average	:	882	:	523	:	388
						238
						1270
						436

area of Minnesota to 100 percent in one of the wheat areas of Montana. In Minnesota and in the eastern part of North Dakota and South Dakota about 50 percent of the farms had tractors; in the central and western parts of the Dakotas, about 70 percent; and in Montana, northeastern Wyoming, and northwestern Nebraska about 80 percent were tractor farms. For the entire region 69 percent of the farmers enumerated used tractors whereas 31 percent did not. In all areas the crop acreage per farm on farms where tractors were used exceeded the crop acreage on farms using only horses for field work. Because of the tendency toward the greater use of tractor power in the areas of large wheat farms the crop acres per farm averaged 120 percent larger on farms having tractors than on farms not having tractors.

In the Pacific Northwest, tractors were used in all areas but the number of non-tractor farms in most areas exceeded the number of farms having tractors (table 2). For the region as a whole, 42 percent of the farm operators used tractors whereas 58 percent did not. The average crop acreage per farm was 95 percent larger on farms having tractors than on non-tractor farms. Farms having tractors as well as non-tractor farms in this region are larger than farms in the Northern Great Plains. In addition, the proportion of farms not having tractors to those reporting tractors far exceeds that of the Northern Great Plains. This is largely due to the fact that the topography of much of the crop area of the Pacific Northwest is very rolling which makes a tractor, especially the high-wheel type, less adapted for field work than on the level, to slightly rolling crop land that prevails in the Northern Great Plains.

Table 2. - Number and size of farms having tractors, and number and size of farms not having tractors, by type-of-farming areas, Pacific Northwest, 1933

State and type-of-farming area	Farms having tractors		Farms not having tractors		All farms	
	Farms studied	Crop area per farm	Farms studied	Crop area per farm	Farms studied	Crop area per farm
	Number	Acres	Number	Acres	Number	Acres
Oregon	:	:	:	:	:	:
56H	:	19	:	1694	:	41
56D	:	26	:	1207	:	30
Washington	:	:	:	:	:	:
46	:	17	:	1372	:	32
56C	:	10	:	2652	:	41
56A	:	25	:	1503	:	63
56B	:	21	:	539	:	58
74	:	9	:	457	:	24
Idaho	:	:	:	:	:	:
56E	:	8	:	787	:	33
79	:	10	:	1032	:	15
90	:	10	:	790	:	23
91A	:	8	:	705	:	29
92A	:	8	:	480	:	15
Total or average	:	171	:	1193	:	404
						849

CROPS PRODUCED ON FARMS HAVING TRACTORS AND NUMBER AND SIZE
OF TRACTORS BY TYPE-OF-FARMING AREAS

In the Northern Great Plains on farms where tractors were used, the proportion of the crop area utilized for the production of different crops varied to a considerable extent in, as well as between, different type-of-farming areas. The agriculture of the region, however, may be classified as primarily a cash grain type-of-farming with wheat the major crop. An examination of table 3 shows that proportionately more of the total crop area was devoted to wheat and summer fallow in central and western Montana and northeastern Wyoming than in the other areas studied. In northeastern Wyoming about 15 percent of the crop area was devoted to corn. Proceeding eastward a rather decided change in cropping practice began to appear. Instead of alternating wheat with summer fallow the common practice was to grow wheat in combination with corn, oats, and barley. In eastern Montana and northwestern and north central North Dakota, wheat was the principal crop grown, with moderate acreages of oats, barley, and corn. These crops and summer fallow accounted for most of the crop acreage. In southwestern North Dakota, western South Dakota, and northwestern Nebraska, wheat was still the dominant crop but the acreage devoted to corn, oats, and barley showed a considerable increase over that of eastern Montana and northwestern and north central North Dakota. In south central North Dakota and central South Dakota wheat still held first rank but acreages of oats and barley and especially corn in central South Dakota were of increasing importance. In eastern North Dakota and South Dakota and western Minnesota wheat occupied from 20 to 50 percent of the crop area with barley, oats, and corn making up most of the balance. The greatest concentration of corn acreage was in eastern South Dakota and southwestern Minnesota. In addition sweet clover, alfalfa, and flax were of considerable importance in western Minnesota and on some farms potatoes were produced on a commercial scale.

In the northern Great Plains tractors of 15-to 17-drawbar horsepower of the ordinary high-wheel type were the most common and were followed in order by those of 8-to 12-drawbar horsepower. General purpose tractors of 9-to 12-drawbar horsepower were quite common in those areas of South Dakota and Nebraska where row crops were grown to a considerable extent. Tractors of the track-laying type were reported only in Montana.

In the Pacific Northwest wheat for grain was the principal crop, table 4. It was alternated with summer fallow. Wheat, together with summer fallow, comprised most of the crop acreage except in area 56B in eastern Washington, where peas were of considerable importance, area 74 in eastern Washington where oats were grown to a considerable extent, and area 92A in southern Idaho where the acreage in alfalfa was quite large.

Tractors in the Pacific Northwest were considerably larger than those in the Northern Great Plains. Because of the rolling topography the track-laying type of tractor was the one in common use. Those of 25-drawbar horsepower were the most common size. A few high-wheel tractors were in use, especially on farms where the topography was fairly level. Where high-wheel tractors were used those of 15-drawbar horsepower were the most common size.

Table 3. - Number and size of farms reporting tractors, and number, size and type of tractors by type-of-farming areas, Northern Great Plains, 1933 1/

State and type: of farming area	:Average:			Crop area per farm						
	: Farms studied:	: size of farms	: Wheat	: Row		: Other		: Summer		: Total
				: Number	: Acres	: Acres	: Acres	: Acres	: Acres	
				:	:	:	:	:	:	
Minnesota	:	:	:	:	:	:	:	:	:	
225A	:	20	374	113	29	154	27	2	325	
226	:	4	460	71	15	210	12	-	308	
225D	:	11	477	142	35	193	34	-	404	
227A	:	15	348	61	101	124	1	-	287	
227B	:	10	321	66	93	104	6	2	271	
North Dakota	:	:	:	:	:	:	:	:		
225B	:	8	702	175	17	263	94	2	551	
173	:	16	635	228	27	148	39	14	456	
174A	:	34	708	187	77	183	18	-	465	
168	:	22	824	312	4	255	114	1	686	
169	:	21	769	411	7	112	58	6	594	
172	:	22	748	239	30	135	16	6	426	
170	:	24	586	162	52	87	-	1	282	
171	:	34	878	340	39	120	2	5	506	
136	:	50	741	329	16	96	53	9	503	
139	:	16	792	353	14	54	67	17	505	
166	:	33	674	253	28	130	60	81	552	
South Dakota	:	:	:	:	:	:	:	:		
181	:	14	528	109	68	219	10	6	412	
182A	:	7	319	54	90	79	-	-	223	
174B	:	18	675	175	93	164	1	5	438	
180	:	16	594	102	134	109	3	2	350	
176	:	33	1273	256	137	237	17	7	654	
179	:	15	2086	364	76	153	-	5	598	
182B	:	14	611	281	83	132	-	-	496	
175	:	20	1043	356	59	129	4	18	566	
142A-177	:	24	918	244	126	88	1	14	473	
Nebraska	:	:	:	:	:	:	:	:		
184	:	32	714	171	110	108	12	14	415	
185	:	20	817	293	198	168	43	10	712	
Montana	:	:	:	:	:	:	:	:		
137A	:	18	646	248	36	67	25	20	396	
119B	:	16	1187	523	16	120	78	7	744	
118	:	21	895	227	9	58	49	49	392	
113	:	47	1285	424	5	80	202	44	755	
114	:	44	727	284	-	57	210	6	557	
115	:	26	1274	583	2	47	454	8	1094	
116	:	36	632	351	3	23	123	11	511	
87D	:	8	958	205	-	61	232	27	525	
88A	:	24	667	218	-	34	226	-	478	
120	:	13	2095	392	14	40	206	10	662	
Wyoming	:	:	:	:	:	:	:	:		
146A	:	29	1031	296	106	77	207	4	690	
Total or average	:	835	842	277	48	114	82	13	534	

Table 3. - Number and size of farms reporting tractors, and number, size and type of tractors by type-of-farming areas, Northern Great Plains, 1933 1/ Continued

State and type of farming area	Number	Farms studied	Farms size of farms	Proportion of crop area per farm					
				Row Wheat crops	Other crops	Summer fallow	Idle	Total	
			Acres	Percent	Percent	Percent	Percent	Percent	Percent
Minnesota									
225A	20	374	34.8	8.9	47.4	8.3	0.6	100	
226	4	460	23.0	4.9	68.2	3.9	-	100	
225D	11	477	35.1	8.7	47.8	8.4	-	100	
227A	15	348	21.3	35.2	43.2	.3	-	100	
227B	10	321	24.4	34.3	38.4	2.2	0.7	100	
North Dakota									
225B	8	702	31.8	3.1	47.7	17.0	0.4	100	
173	16	635	50.0	5.9	32.5	8.5	3.1	100	
174A	34	708	40.2	16.6	39.3	3.9	-	100	
168	22	824	45.5	0.6	37.2	16.6	0.1	100	
169	21	769	69.2	1.2	18.8	9.8	1.0	100	
172	22	748	56.1	7.0	31.7	3.8	1.4	100	
170	24	586	57.4	11.3	30.9	-	0.4	100	
171	34	878	67.2	7.7	23.7	0.4	1.0	100	
136	50	741	65.4	3.2	19.1	10.5	1.8	100	
139	16	792	69.9	2.8	10.7	13.3	3.3	100	
166	33	674	45.8	5.1	23.5	10.9	14.7	100	
South Dakota									
181	14	528	26.5	16.5	53.1	2.4	1.5	100	
182A	7	319	24.2	40.4	35.4	-	-	100	
174B	18	675	40.0	21.2	37.5	0.2	1.1	100	
180	16	594	29.1	38.3	31.1	0.9	0.6	100	
176	33	1273	39.1	21.0	36.2	2.6	1.1	100	
179	15	2086	60.9	12.7	25.6	-	0.8	100	
182B	14	611	56.7	16.7	26.6	-	-	100	
175	20	1043	62.9	10.4	22.8	0.7	3.2	100	
142A-177	24	918	51.6	26.6	18.6	0.2	3.0	100	
Nebraska									
184	32	714	41.2	26.5	26.0	2.9	3.4	100	
185	20	817	41.2	27.8	23.6	6.0	1.4	100	
Montana									
137A	18	646	62.6	9.1	16.9	6.3	5.1	100	
119B	16	1187	70.3	2.2	16.1	10.5	.9	100	
118	21	895	57.9	2.3	14.8	12.5	12.5	100	
113	47	1285	56.2	0.7	10.6	26.7	5.8	100	
114	44	727	51.0	-	10.2	37.7	1.1	100	
115	26	1274	53.3	0.2	4.3	41.5	0.7	100	
116	36	632	68.7	0.6	4.5	24.1	2.1	100	
87D	8	958	39.1	-	11.6	44.2	5.1	100	
88A	24	667	45.6	-	7.1	47.3	-	100	
120	13	2095	59.2	2.1	6.1	31.1	1.5	100	
Wyoming									
146A	29	1031	42.9	15.4	11.1	30.0	0.6	100	
Total or average	835	842	51.9	9.0	21.3	15.4	2.4	100	

Table 3. - Number and size of farms reporting tractors, and number, size, and type of tractors by type-of-farming areas, Northern Great Plains, 1933 1/ Continued

		Size of tractors (Drawbar horsepower)														
State and Farms:		age	General	Ordinary high-wheel					Track-laying			Total				
type-of-farming	studied	size	purpose	9-12	12-15	15-17	18-21	22-25	26-28	28-35	35-40	20	25	39	50	
area		farms	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	
Minnesota		Num-ber	Acres	Num-ber	Num-ber	Num-ber	Num-ber	Num-ber	Num-ber	Num-ber	Num-ber	Num-ber	Num-ber	Num-ber	Num-ber	
	225A	20	374	-	-	-	12	8	1	-	-	-	-	-	-	21
	226	4	460	-	-	-	2	1	1	-	-	-	-	-	-	4
	225D	11	477	-	-	-	5	5	1	1	-	-	-	-	-	12
	227A	15	348	3	-	-	9	5	1	-	-	-	-	-	-	18
	227B	10	321	1	-	-	6	3	-	-	1	-	-	-	-	11
No. Dak.																
	225B	8	702	-	-	-	4	4	3	-	-	-	-	-	-	11
	173	16	635	1	-	-	4	7	3	2	-	-	-	-	-	17
	174A	34	708	4	-	-	14	13	3	1	2	-	-	-	-	37
	168	22	824	-	-	-	3	14	5	-	1	-	-	-	-	22
	169	21	769	-	-	-	1	15	6	1	2	-	-	-	-	25
	172	22	748	-	-	-	3	13	4	1	1	-	-	-	-	22
	170	24	586	-	-	-	10	9	5	1	-	-	-	-	-	25
	171	34	878	-	-	-	7	20	9	-	3	-	-	-	-	39
	136	50	741	-	-	-	6	34	11	1	5	-	1	1	-	57
	139	16	792	-	-	-	5	9	1	1	1	-	-	-	-	17
	166	33	674	-	-	-	5	23	4	2	-	-	-	-	-	34
So. Dak.																
	181	14	528	3	2	-	5	2	1	2	1	-	-	-	-	16
	182A	7	319	2	-	-	3	2	-	-	-	-	-	-	-	7
	174B	18	675	7	-	-	5	4	2	1	-	-	-	-	-	19
	180	16	594	8	-	-	3	2	5	-	-	-	-	-	-	18
	176	33	1273	17	-	-	12	7	6	6	-	-	-	-	-	48
	179	15	2086	2	-	-	7	9	1	1	-	-	-	-	-	19
	182B	14	611	4	1	-	6	3	-	-	1	-	-	-	-	15
	175	20	1043	6	-	-	13	3	3	-	-	-	-	-	-	25
	142A-177	24	918	9	-	-	13	6	3	-	-	-	-	-	-	31
Nebraska																
	184	32	714	7	-	-	5	20	1	1	-	-	-	-	-	34
	185	20	817	5	1	-	3	12	5	1	-	-	-	-	-	27
Montana																
	137A	18	646	-	-	-	4	16	1	-	-	-	-	-	-	21
	119B	16	1187	1	-	-	1	13	3	1	2	-	-	-	-	21
	118	21	895	-	-	-	1	13	7	1	-	-	-	-	-	22
	113	47	1285	1	-	-	2	40	10	2	1	-	-	2	-	58
	114	44	727	-	-	-	2	25	14	2	5	-	1	2	-	52
	115	26	1274	-	-	-	-	12	4	2	5	-	3	1	3	30
	116	36	632	-	-	-	3	26	5	-	5	-	2	-	-	41
	87D	8	958	-	-	-	2	6	-	-	-	-	-	-	-	8
	88A	24	667	-	-	-	2	22	4	-	-	-	-	-	-	28
	120	13	2095	3	-	-	-	12	-	-	-	-	-	-	-	15
Wyoming																
	146A	29	1031	2	-	-	4	20	3	4	1	-	-	-	-	34
Total or average																
		235	842	86	4	177	171	177	76	75	2	4	8	1	4	961

17 The number of reports shown in this table as well as in all succeeding tables

The number of reports shown in this table as well as in all succeeding tables for the Northern Great Plains is somewhat less than that in table 1 for the reason that tractors used solely for belt work as well as a limited number with incomplete data on one or more items of costs were omitted.

Table 4. - Number and size of farms reporting tractors, and number, size, and type of tractors by type-of-farming areas, Pacific Northwest, 1933 1/

State	Aver-	Crop area per farm						Proportion of crop area per farm								
		and	Farm	size	age	type-of-stud	size	Row	Other	mer	Tot-	new	Other	mer	Tot-	
area	area	farm	farm	low	high	wheat	crops	crops	ful	Idle	wheat	crops	crops	ful	Idle	al
Oregon		Num-	·	·	·	·	·	·	·	·	·	Per-	Per-	Per-	Per-	Per-
		ber	acres	acres	acres	acres	acres	acres	Acres	Acres	Acres	cent	cent	cent	cent	cent
56H	17	2086	695	-	14	747	9	1465	47.4	-	1.0	51.0	0.6	100		
56D	25	1397	585	-	42	555	-	1182	49.5	-	3.6	46.9	-	100		
Wash.		·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
46	13	1953	747	-	35	606	22	1470	50.8	-	2.4	45.3	1.5	100		
56C	9	3383	1495	-	3	1615	-	3114	48.0	-	.1	51.9	-	100		
56A	18	1427	895	-	9	644	-	1358	51.2	-	.7	48.1	-	100		
56B	19	654	276	3	136	149	-	564	49.0	0.5	24.1	26.4	-	100		
74	9	601	182	12	81	176	6	457	33.9	2.6	17.7	38.5	1.3	100		
Idaho		·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
56E	3	687	245	-	23	227	-	495	43.5	-	4.6	45.9	-	100		
79	9	1347	507	-	63	465	66	1101	45.1	-	5.7	42.2	6.0	100		
90	10	976	382	-	3	323	82	790	43.3	-	.4	40.9	10.4	100		
91A	7	913	364	-	50	289	-	703	51.8	-	7.1	41.1	-	100		
92A	7	625	234	-	40	213	2	489	47.8	-	8.2	43.6	.4	100		
Total or:		·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Average:	146	1401	563	1	45	530	13	1152	48.9	.1	3.9	46.0	1.1	100		

1/ The number of reports shown in this table as well as in all succeeding tables for the Pacific Northwest is somewhat less than that in table 2, for the reason that tractors used solely for belt work as well as a limited number with incomplete data on one or more items of cost were omitted.

CROP AREA PER FARM ON FARMS HAVING TRACTORS, AND NUMBER,
TYPE, AND SIZE OF TRACTORS

The number of tractors by size and type according to acreage in crops on farms reporting tractors for the Northern Great Plains is given in table 5. In this region there did not appear to be any decided relationship between crop acreage per farm and size of tractor. There was some tendency for the larger tractors, especially those of the track-laying type, to be found on the larger farms but a greater tendency for those farmers who are operators of large acreages to use two or more tractors of medium size rather than to invest in the larger tractors. For the most part those farmers with about 400 crop acres or less per farm had only one tractor whereas on quite a large percentage of the farms with a crop acreage in excess of this more than one tractor was owned. Fifty-four percent of all tractors enumerated were on farms of 500 crop acres or less, 33 percent were on farms of 501 to 1,000 crop acres, and 13 percent were on farms of over 1,000 crop acres.

In the Pacific Northwest where farms are larger than in the Northern Great Plains, the size of tractor increased somewhat with an increase in crop acreage, but not uniformly, the tendency being to use tractors of medium size regardless of crop acreage (table 6). Twenty-three percent of all tractors represented were on farms of 500 or less crop acres; 30 percent were on farms of from 501 to 1,000 crop acres; and 47 percent were on farms of over 1,000 crop acres.

KINDS OF TRACTOR WORK AND ANNUAL HOURS OF USE PER TRACTOR
BY TYPE-OF-FARMING AREAS

The annual use of tractors in these areas is influenced largely by the number of crop acres per farm and kinds of crops grown.

In a few instances miscellaneous work performed with tractor power may have been overlooked in recording the work done with tractors on these farms, but for the most part the kinds and amounts of work performed with tractor power are accounted for in work of different kinds by type-of-farming areas as shown in tables 7 and 8.

A limited amount of tractor work in the Northern Great Plains consisted of corn shredding, corn shelling, and silo filling. When this work occurred it was recorded as "Corn harvest". Tractors in this region were used almost universally for preparation of seedbed, and to a large extent, for planting of crops. In addition tractors of the general purpose type were used quite extensively for cultivation of row crops. The harvest work was influenced largely by the method of harvesting the crop. In western Minnesota and in the eastern and central areas of North Dakota and South Dakota the work of tractors, except that of preparation of seedbed and planting, was mainly that of harvesting grain with a binder and threshing with a stationary thresher, and corn harvesting, whereas in the other types of farming areas, where harvesting with a combine was a common method and little corn was grown, the use of the tractor except for preharvest work was largely for harvesting and

Table 5. - Distribution of tractors of different sizes and types according to crop acres per farm, Northern Great Plains, 1933

12.

Size group (crop acres)	All tractors farms	General purpose	Size (drawbar horsepower)												Total tractors			
			9-12			15-17			18-21			22-25			26-28			Track-laying
			H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	
50 and less	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
51 to 100	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4
101 to 150	36	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	37
151 to 200	47	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	48
201 to 250	66	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	72
251 to 300	96	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	98
301 to 350	76	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	78
351 to 400	71	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	72
401 to 450	53	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	56
451 to 500	51	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	56
501 to 550	54	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	50
551 to 600	43	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	49
391 to 650	41	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	46
651 to 700	38	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	65
701 to 750	17	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	21
751 to 800	17	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	18
801 to 850	13	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	17
851 to 900	23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	28
201 to 250	8	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	10
951 to 1000	13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
1001 to 1100	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19
1101 to 1200	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11
1201 to 1300	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12
1301 to 1400	8	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	8
1401 to 1500	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10
1501 to 1600	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1601 to 1700	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1701 to 1800	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
1801 to 1900	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1901 to 2000	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10
2201 to 2400	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2401 to 2600	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
2601 to 2800	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8
2801 to 3000	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6
3001 and over	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	361
Total	835	4	173	471	137	36	35	2	4	8	1	4	3	2	4	1	4	361

Table 6. - Distribution of tractors of different sizes and types according to crop acres per farm, Pacific Northwest, 1933

Size group (Crop acres)	All tractor farms	Size (Drawbar horsepower)										Total tractors	
		Ordinary high-wheel					Track-laying						
		H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.		
Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	
200 and less	5	1	1					1	2			5	
201 - 250	1	1										1	
251 - 300	7	2	1				1	1	2			7	
301 - 350	6	2	2					2	1			7	
351 - 400	3							1	1	1		3	
401 - 450	7		1					2	3	1		7	
451 - 500	7		1	1				2	3			7	
501 - 550	3	2							2			4	
551 - 600	4							1	3			4	
601 - 650	6							1	5			6	
651 - 700	10		2	1				3	2	1	1	10	
701 - 750	3		1					1	1			3	
751 - 800	8			1		1		1	3	1	1	8	
801 - 850	5			1			1	1	1		1	5	
851 - 900	3		1						2			3	
901 - 950	2								1	1		2	
951 - 1000	3				1				2			3	
1001 - 1100	3							1	2			3	
1101 - 1200	4		1						2	1		4	
1201 - 1300	6		3			1			2		2	8	
1301 - 1400	1		1			1						2	
1401 - 1500	9		4						2		3	9	
1501 - 1600	2								3			3	
1601 - 1700	3							1		1	1	3	
1701 - 1800	5		3								2	5	
1801 - 1900	2										2	2	
1901 - 2000	9								10		1	11	
2001 - 2200	2								2			2	
2201 - 2400	1										1	1	
2401 - 2600	8		1						5	1	2	9	
2601 - 2800	4								2		2	4	
2801 - 3000	1									1		1	
3001 and over	3								7	4	4	11	
Total	146	8	23	4	1	3	2	19	71	9	23	163	

Table 7. - Estimated normal annual hours of use of tractors on work of different kinds by type-of-farming areas, Northern Great Plains

State and type-of- farming areas	Number of farms	Crop having area	Tract- ors per farm	Number of farms	Home work										
					Pre- pare	Crop plant	Com- bine	Corn	Hay	Potato	Bind	Thresh	har-	har-	
					tract-	per	culti-	grain	grain	grain	vest	vest	vest	vest	al
					Number	Number	Acres	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours
Minnesota															
	225A	21	20	325	213	5	-	12	6	2	9	-	-	247	
	226	4	4	308	249	-	-	30	12	-	-	-	-	291	
	225D	12	11	404	248	26	-	10	13	2	-	-	-	299	
	227A	18	15	287	252	-	-	30	13	18	-	-	-	313	
	227B	11	10	271	259	-	-	42	11	14	-	-	-	326	
No. Dak.															
	225B	11	8	551	301	31	-	45	23	-	1	-	-	401	
	173	17	16	456	352	7	-	47	26	-	4	-	-	436	
	174A	37	34	465	292	6	-	17	35	18	1	-	-	369	
	168	22	22	686	461	14	-	16	25	-	-	-	-	516	
	169	25	21	594	235	7	-	47	51	-	-	-	-	340	
	172	22	22	425	252	17	27	9	21	5	-	-	-	331	
	170	25	24	282	149	-	4	3	29	9	-	-	-	194	
	171	39	34	506	237	59	2	1	38	8	-	-	-	345	
	136	57	50	503	293	50	3	12	15	1	-	-	-	374	
	139	17	16	505	329	70	-	4	21	-	-	-	-	424	
	166	34	33	552	292	9	2	37	32	-	-	-	-	372	
So. Dak.															
	181	16	14	412	242	17	-	53	32	15	6	-	-	365	
	182A	7	7	236	101	4	-	19	11	4	-	-	-	139	
	174B	19	18	438	349	2	-	57	34	8	8	-	-	458	
	180	18	16	350	267	-	1	22	40	12	-	-	-	342	
	176	48	33	654	288	24	17	56	37	27	9	-	-	458	
	179	19	15	598	242	71	-	34	18	16	75	-	-	456	
	182B	15	14	496	197	47	-	71	49	22	-	-	-	386	
	175	25	20	566	244	40	10	9	18	6	-	-	-	327	
142-177	31	24	473	248	51	-	15	10	10	3	-	-	-	337	
Nebraska															
	184	34	32	415	245	54	-	13	14	4	-	2	-	332	
	185	27	20	712	354	83	-	18	10	9	-	47	521		
Montana															
	137A	21	18	396	221	46	-	-	26	-	-	-	-	293	
	119B	21	16	744	390	86	22	2	6	-	-	-	-	506	
	118	22	21	392	271	35	-	5	9	-	-	-	-	320	
	113	58	47	755	371	75	9	2	10	-	-	-	-	467	
	114	52	44	557	370	71	-	3	3	-	-	-	-	447	
	115	30	26	1094	497	124	-	-	5	-	-	-	-	626	
	116	41	36	509	221	58	-	-	2	-	-	-	-	281	
	87D	8	8	525	332	11	-	7	40	-	-	-	-	390	
	88A	28	24	478	354	56	-	2	5	-	-	-	-	417	
	120	15	13	662	332	111	-	-	3	2	-	-	-	448	
Wyoming															
	146A	34	29	690	554	99	2	4	2	7	-	-	-	668	
Total or: average:	961	835	534	303	45	3	17	19	6	3	1	397			

Table 7. - Estimated normal annual hours of use of tractors on work of different kinds by type-of-farming areas, Northern Great Plains -

Continued

State and type-of-farming areas	Number	Number	Acres	Hours	Custom work						Total work	
					Farms	Crop tractors	Prepared per farm	Combine plant	Bind grain	Thresh grain	Corn harvest	
Minnes.:												
225A	21	20	325	-	11	-	-	7	-	-	18	265
226	4	4	308	-	-	-	-	-	-	-	-	291
225D	12	11	404	-	-	-	-	-	-	-	-	299
227A	18	15	287	-	-	-	-	16	-	-	16	329
227B	11	10	271	-	-	-	2	22	-	-	22	348
No. Dak.:												
225B	11	8	551	-	-	-	-	-	-	-	-	401
173	17	16	456	-	-	-	-	16	5	21	457	
174A	37	34	465	1	-	-	-	4	-	-	-	374
168	22	22	686	-	-	-	-	-	-	-	-	516
169	25	21	594	1	-	-	-	1	-	-	2	342
172	22	22	425	-	2	9	-	-	-	-	11	342
170	25	24	282	1	-	-	-	2	-	-	3	197
171	39	34	506	6	6	-	-	-	-	-	12	357
136	57	50	503	-	1	-	-	-	-	-	1	375
139	17	16	505	-	1	-	-	-	-	-	1	425
166	34	33	552	-	-	-	-	2	-	-	2	374
So. Dak.:												
181	16	14	412	-	-	-	-	39	12	51	416	
182A	7	7	236	-	-	-	-	-	-	-	-	139
174B	19	18	438	6	-	-	-	-	-	-	6	464
180	18	16	350	-	1	-	-	6	-	-	7	349
176	48	33	654	6	-	-	-	3	-	-	9	467
179	19	15	598	4	6	-	-	-	-	-	10	466
182B	15	14	496	3	-	-	-	-	-	-	3	389
175	25	20	566	-	1	-	-	-	-	-	1	328
142A-177	31	24	473	5	8	3	-	-	-	-	16	355
Nebraska:												
184	34	32	415	-	9	-	-	-	-	-	9	341
185	27	20	712	-	2	-	-	-	-	-	2	523
Montana:												
137A	21	18	396	-	6	-	-	-	-	-	6	299
119B	21	16	744	-	-	-	-	10	-	-	10	516
118	22	21	392	-	-	-	-	-	-	-	-	320
113	58	47	755	-	2	-	-	-	-	-	2	469
114	52	44	557	-	13	-	-	-	-	-	13	460
115	30	26	1094	-	-	-	-	-	-	-	-	626
116	41	36	509	1	1	-	-	2	-	-	4	285
87D	8	8	525	-	-	-	-	-	-	-	-	390
88A	28	24	478	-	-	-	-	-	-	-	-	417
120	15	13	662	-	3	-	-	-	-	-	3	451
Wyoming:												
146A	34	29	690	-	2	-	-	-	-	-	2	670
Total or: average:	961	835	534	1	3	-	-	3	-	-	7	404

Table 8. - Estimated normal annual hours of use of tractors on work of different kinds by type-of-farming areas, Pacific Northwest

State and type-of-farming area	Number	Number	Acres	Home work			Custom work			
				Crop area	Prepare plant	Hours	Hours	Hours	Hours	
Oregon	20	17	1465	598	154	1	752	14	752	
564	25	1182	609	147	2	753	14	14	772	
56D										
Washington	46	14	13	1470	425	152	1	576	3	583
56C	14	9	3114	164	150	1	314	2	316	
56A	18	18	1338	376	109	1	485	25	529	
56B	21	19	564	415	111	9	535	35	570	
74	11	9	457	303	62	12	380	18	398	
Idaho										
56E	3	3	495	471	92	1	563	17	580	
73	10	9	1101	444	98	1	542	27	569	
90	11	10	730	385	124	1	509	5	514	
91A	7	7	703	464	112	1	576	9	585	
92A	7	7	489	294	61	1	355	143	559	
Total or average	163	146	1152	435	123	1	560	9	585	

threshing grain with a combine. Custom work was of minor importance, being mainly harvesting and threshing grain, either with the combined harvester-thresher or harvesting with a binder and threshing with a stationary thresher. The total work for tractors of all sizes amounted to an annual average of 404 hours per tractor per year of which 98 percent was home work and 2 percent custom work.

The work of tractors in the Pacific Northwest was almost entirely that of preparation of seedbed and planting of grain crops and harvesting with a combined harvester-thresher. The total work for tractors of all sizes amounted to an average of 585 hours per tractor per year of which 96 percent was home work and 4 percent was custom work.

ANNUAL HOURS OF USE OF TRACTORS OF
DIFFERENT TYPES AND SIZES

In the Northern Great Plains the work of general purpose tractors (table 9) amounted to an average of 458 hours per tractor per year; for ordinary high-wheel tractors it was 392 hours and for track-laying tractors, 760 hours. The greater annual use of the general purpose tractor as compared with the ordinary high-wheel tractor was mainly accounted for by its use in cultivating row crops. The large number of days of annual use of the track-laying tractor was mainly because of the fact that this type of tractor was used almost exclusively on farms of the largest crop acreages.

Table 9. - Estimated normal annual hours of use of tractors of different types and sizes, Northern Great Plains

Type of tractor	Size of tractor (Drawbar horsepower)	Annual use of tractor Hours
General purpose	9 - 12	450
	15	635
Average		458
Ordinary high-wheel	8 - 12	329
	15 - 17	407
	18 - 21	383
	22 - 25	484
	26 - 28	439
	35 - 40	443
Average		392
Track-laying	20	617
	25	584
	39	1277
	50	1124
Average		760

In the Pacific Northwest the work of ordinary high-wheel tractors amounted to an average of 373 hours per tractor per year; and for track-laying tractors it was 657 hours per tractor per year, table 10. As in the Northern Great Plains, the lesser amount of work done annually by high-wheel tractors than with track-laying tractors was largely because of the fact that the high-wheel tractor was used principally on the small to medium sized farms.

Table 10. - Estimated normal annual hours of use of tractors of different types and sizes, Pacific Northwest

Type of tractor	Size of tractor (Drawbar horsepower)	Annual use of tractor	
		Hours	
Ordinary high-wheel	10	186	
	15	402	
	18	515	
	20	803	
	22	410	
	26	224	
	Average	373	
Track-laying	20	520	
	25	671	
	39	715	
	50	703	
	Average	657	

The distribution of tractors of different types and sizes in the Northern Great Plains by hours used annually (table 11) shows that 71 percent were used 500 hours or less; 19 percent were used from 501 to 750 hours; whereas only 10 percent were used over 750 hours per year. In the Pacific Northwest 58 percent of the high-wheel tractors were used 400 hours or less; 37 percent were used from 401 to 800 hours and only 5 percent were used more than 800 hours annually. Thirty-one percent of the track-laying tractors were used 400 hours or less; 43 percent were used 401 to 800 hours and 26 percent were used more than 800 hours annually, table 12.

COST OF USING TRACTORS

In presenting this information the various items of cost are treated separately and reported in quantity factors wherever possible, since costs expressed as money units are subject to considerable change especially during periods of wide price fluctuations. The items which have been considered as operating cost are fuels, lubricants, repairs, depreciation, and interest.

Hours used annually	General		purpose		Ordinary		high-wheel		Track-laying		Total	
	Num- ber	Num- ber	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	tractors
Under 50	2	4	3	2	2	2	2	2	2	2	2	13
51 to 100	5	14	20	7	3	1	2	1	1	1	1	49
101 to 150	2	16	23	14	3	1	2	1	1	1	1	59
151 to 200	4	52	48	12	2	2	1	1	1	1	1	102
201 to 250	6	17	45	15	3	2	1	1	1	1	1	87
251 to 300	7	11	44	13	2	1	1	1	1	1	1	78
301 to 350	9	17	42	16	4	3	1	1	1	1	1	92
351 to 400	10	1	7	44	10	1	4	3	1	1	1	73
401 to 450	9	1	9	39	6	3	3	3	1	1	1	56
451 to 500	2	10	27	7	7	3	4	3	1	1	1	34
501 to 550	5	1	10	25	12	3	1	1	1	1	1	43
551 to 600	1	1	3	23	2	2	1	1	1	1	1	30
601 to 650	6	6	6	27	3	1	1	1	1	1	1	20
651 to 700	5	6	12	3	1	1	1	1	1	1	1	16
701 to 750	1	1	11	1	1	1	1	1	1	1	1	14
751 to 800	3	5	7	7	4	2	2	1	1	1	1	9
801 to 850	1	1	1	7	1	2	1	1	1	1	1	13
851 to 900	3	1	1	7	3	1	2	1	1	1	1	9
901 to 950	1	1	1	3	1	1	1	1	1	1	1	7
951 to 1000	1	1	2	4	1	1	1	1	1	1	1	5
1001 to 1050	1	1	1	1	1	1	1	1	1	1	1	4
1051 to 1100	1	1	1	1	1	1	1	1	1	1	1	3
1101 to 1150	1	1	1	1	1	1	1	1	1	1	1	1
1151 to 1200	1	1	1	1	1	1	1	1	1	1	1	1
1201 to 1250	1	1	1	1	1	1	1	1	1	1	1	1
1251 to 1300	1	1	1	1	1	1	1	1	1	1	1	1
1301 to 1350	1	1	1	1	1	1	1	1	1	1	1	1
1351 to 1400	1	1	1	1	1	1	1	1	1	1	1	1
1401 to 1450	1	1	1	1	1	1	1	1	1	1	1	1
1451 to 1500	1	1	1	1	1	1	1	1	1	1	1	1
1501 and over	1	1	1	1	1	1	1	1	1	1	1	3
Total	86	4	173	471	137	36	35	2	4	8	1	961

Table 12. - Distribution of tractors of different types and sizes by hours, used annually, Pacific Northwest, 1933

Hours used annually	Size (Drawbar horsepower)										
	Ordinary high-wheel						Track-laying				
	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	Total tractors
	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber	Num- ber
50 and less											5
51 - 100	3	1					1	1		1	7
101 - 150	1	3					1	1			6
151 - 200	1	4	1					3		1	10
201 - 250		1					3	1	1	1	7
251 - 300	1	1					3	3		2	10
301 - 350	1						1	2		1	5
351 - 400		2			2	1		6	1		12
401 - 450	1	1					1	4	1	2	10
451 - 500		1			1			3			5
501 - 550		2	1				1	5		2	11
551 - 600		3					1	4	1		9
601 - 650		1	1					1	1		4
651 - 700		1					2	3			6
701 - 750							1	8	1	1	11
751 - 800		1	1				1	4		4	11
801 - 850				1			1	1		3	6
851 - 900								2			2
901 - 950								2			2
951 - 1000							1	1		4	6
1001 - 1050		1								1	2
1051 - 1100								1			1
1101 - 1150											
1151 - 1200								2			2
1201 - 1250								3	1		4
1251 - 1300											
1301 - 1350											
1351 - 1400											
1401 - 1450											
1451 - 1500											
1501 and over							1	6	1	1	9
Total	8	23	4	1	3	2	19	71	9	23	133

The quantities and cost of these items per tractor per year are averages which were computed by dividing the total expense for a given item of cost by the total number of tractors included in the study. The yearly cost divided by the total number of 10-hour days a tractor was used during the year is the average cost of operation per day. The hours of work per tractor per year represents the normal rather than the hours actually used in 1933.

Tables 14 to 17 give the itemized cost of operating tractors of different types and sizes in the Northern Great Plains and tables 19 to 22 present corresponding data for the Pacific Northwest. The quantities of fuel and cylinder oil shown in tables 13 and 18 are based on the normal annual consumption rather than on the quantities used in 1933. The cost of fuel and lubricants shown in tables 14 and 19 is based on the normal annual consumption of fuel, oils, and grease at prevailing 1933 prices.

The cash repairs shown in tables 15 and 20 represent normal tractor repair charges rather than actual expenditures in 1933. The cost of hired and other labor on tractor repairs reflects the normal annual days of labor at prevailing 1933 rates for labor.

Depreciation as shown in tables 16 and 21 was computed by dividing the first cost of the tractor by the estimated years of useful life. Interest shown in these tables was charged at 6 percent of one-half of the average first cost of the tractor.

For the ordinary high-wheel tractor in the Northern Great Plains, fuel and lubricants constituted 44.3 percent of the total annual cost of operating tractors; cash repairs, 10.4 percent; hired labor on repairs, 0.1 percent; other labor, 1.7 percent; depreciation, 33.3 percent; and interest, 10.2 percent.

In the Pacific Northwest the percentage distribution of the total cost for track-laying tractors was as follows: Fuel and lubricants, 47.3 percent; cash repairs, 11.1 percent; hired labor, 0.3 percent; other labor, 1.5 percent; depreciation, 30.4 percent; and interest 9.4 percent.

Tractor operators who have no indebtedness on their tractors may consider fuel and lubricants and cash repairs including hired labor on repairs as cash costs and operator and family labor on repairs, depreciation, and interest as non-cash costs. For tractor operators who have little if any equity in their tractors the cash outlay will include practically all expense except operator and family labor on repairs.

Table 13. - Motor fuels and cylinder oil consumed by tractors of different types and sizes, Northern Great Plains 1/

GENERAL PURPOSE TRACTORS									
		Gasoline	Diesel	Kerosene	Total				
		<u>line 2/</u>	<u>late 2/</u>	<u>seine 2/</u>	<u>motor fuel 2/</u>				Cylinder oil
Size of tractor (drawbar horsepower)		Per Tractors	Per tractor	Per tractor	Per tractor	Per hour	Per day	Per hour	Per day
		per year	per year	per year	per year	of use	of use	of use	of use
	Number	Gallons	Gallons	Gallons	Gallons	Gallons	Gallons	Gallons	Gallons
9 - 12	86	157	611	76	844	18.8	27.6	.61	
15	4	40	1226		1266	19.9	40.5	.64	
Total or average	90	152	638	73	863	18.8	28.2	.61	
ORDINARY HIGH-WHEEL TRACTORS									
8 - 12	173	225	381	46	652	19.8	23.2	.71	
15 - 17	471	347	541	2	890	21.9	40.4	.99	
18 - 21	137	640	573	8	1221	31.9	38.3	1.00	
22 - 25	36	719	944		1663	34.4	57.2	1.18	
26 - 28	35	926	694		1620	36.9	50.5	1.15	
35 - 40	2	770	1002		1772	40.0	53.2	1.20	
Total or average	854	410	538	12	959	24.5	37.7	.96	
TRACK-LAYING TRACTORS									
20	4	1192	524		1716	27.8	59.8	.97	
25	8	1132	995		2127	36.4	70.2	1.20	
39	1	5300			5300	41.5	95.8	.75	
50	4	6728			6728	59.8	149.0	1.33	
Total or average	17	2708	592		3300	40.2	87.8	1.16	

1/ Based on the normal consumption of motor fuels and cylinder oil.

2/ Average of all tractors.

Table 14. - Cost of motor fuels and lubricants consumed by tractors of different types and sizes, Northern Great Plains 1/

GENERAL PURPOSE TRACTORS

	: Gaso-	: Distil-	: Kero-	: Total	:		: Other oils
Size of	: line 2/	: late 2/	: sene 2/	: motor fuels 2/	:	Cylinder oil	: and grease
tractor	: Per	: Per	: Per	: Per	: Per	: Per	: Per
(drawbar- horse- power	: tractor	: tractor	: tractor	: tractor	: tractor	: tractor	: tractor
per	: per	: per	: per	: hour day	: per	: hour day	: per
year	: year	: year	: year	: of use	: year	: of use	: year
	: Dollars	: Dollars	: Dollars	: Dollars	: Dollars	: Dollars	: Dollars
9 - 12	: 26.79	: 53.15	: 7.65	: 87.59	: 1.95	: 16.39	: .36
15	: 7.04	: 102.12		: 109.16	: 1.72	: 23.67	: .37
Average	: 25.91	: 55.33	: 7.31	: 88.55	: 1.93	: 16.71	: .36

ORDINARY HIGH-WHEEL TRACTORS

8 - 12	: 33.50	: 34.49	: 4.98	: 72.97	: 2.22	: 13.59	: .41	: 6.58	: .20
15 - 17	: 56.04	: 70.55	: 5.16	: 131.75	: 3.24	: 25.28	: .62	: 9.77	: .24
18 - 21	: 100.52	: 51.24	: .71	: 152.47	: 3.98	: 23.68	: .62	: 9.58	: .25
22 - 25	: 114.54	: 90.12		: 204.66	: 4.23	: 34.87	: .72	: 12.10	: .25
26 - 28	: 151.02	: 63.12		: 214.14	: 4.84	: 33.38	: .76	: 11.41	: .26
35 - 40	: 122.00	: 80.10		: 202.10	: 4.56	: 34.58	: .78	: 12.40	: .28
Average	: 65.12	: 60.69	: 3.97	: 129.78	: 3.31	: 23.41	: .60	: 9.26	: .24

TRACK-LAYING TRACTORS

20	: 142.46	: 36.68		: 179.14	: 2.90	: 37.62	: .61	: 61.70	: 1.00
25	: 184.84	: 75.64		: 260.48	: 4.47	: 43.17	: .74	: 64.24	: 1.10
39	: 848.00			: 848.00	: 6.64	: 71.84	: .56	: 146.86	: 1.15
50	: 1101.31			: 1101.31	: 9.80	: 107.59	: .96	: 146.12	: 1.30
Average	: 426.52	: 44.22		: 473.74	: 6.25	: 58.71	: .77	: 87.77	: 1.15

1/ Based on the normal consumption of fuel, oil, and grease, at prices paid in 1933.

2/ Average of all tractors.

Table 15. - Cost of cash repairs and labor on repairs for tractors of different types and sizes, Northern Great Plains

GENERAL PURPOSE TRACTORS

Size of tractor (drawbar horsepower)	Farm labor on repairs							
	Cash repairs 1/		Owner and family		Hired		Cost 3/	
	Tractors	Reports	tractor	Reports	tractor	Reports	tractor	tractor
			Per		Per		Per	Per
			per		per		per	per
			year		year 2/		year 2/	year 2/
	Number	Number	Dollars	Number	Days	Number	Days	Dollars
9 - 12	86	86	22.83	80	2.7	17	.34	5.69
15	4	4	31.25	4	3.0	-	-	6.00
Total or average	90	90	23.20	84	2.7	17	.34	5.70

ORDINARY HIGH-WHEEL TRACTORS

8 - 12	173	173	21.51	155	2.6	27	.30	5.32
15 - 17	471	471	41.62	444	3.2	75	.29	6.91
18 - 21	137	137	42.43	129	3.7	18	.26	7.64
22 - 25	36	36	44.36	35	3.4	3	.14	6.94
26 - 28	35	35	48.86	34	3.7	3	.14	7.49
35 - 40	2	2	20.00	2	3.5	-	-	6.50
Total or average	854	854	38.04	799	3.2	126	.27	6.73

TRACK-LAYING TRACTORS

20	4	4	46.25	4	3.5	1	.25	7.12
25	8	8	80.00	8	5.6	1	.20	15.06
39	1	1	200.00	1	15.0	-	-	37.50
50	4	4	75.00	4	11.0	-	-	26.25
Total or average	17	17	77.94	17	7.5	2	.16	17.14

1/ Normal cash outlay for new parts and skilled labor on repairs in machine shops.

2/ Average of all tractors.

3/ Represents the value of the normal time spent on tractor repair work at 1933 rates for labor.

Table 16. - Average first cost, age in 1933, years of useful life, depreciation and interest charges for tractors of different types and sizes, Northern Great Plains

GENERAL PURPOSE TRACTORS						
Size of : tractor : (drawbar : horsepower):	: Average : Average : first : age : Useful : cost : in 1933 : life : Number. : Dollars : Years : Years : :	Depreciation : per : per : tractor : tractor : tractor : per year 1/ : per year 2/	Interest : per : tractor : per : per year 2/			
9 - 12	86 : 897 : 4.7 : 10.1 : 88.81		26.90			
15	4 : 1044 : 1.5 : 8.2 : 127.32		31.31			
Total or average	90 : 904 : 4.6 : 10.0 : 90.40		27.10			

ORDINARY HIGH-WHEEL TRACTORS						
8 - 12	173 : 836 : 6.1 : 10.6 : 78.86		25.08			
15 - 17	471 : 1273 : 5.8 : 10.3 : 123.59		38.20			
18 - 21	137 : 1440 : 5.2 : 9.9 : 145.45		43.19			
22 - 25	36 : 1389 : 4.6 : 8.8 : 157.84		41.68			
26 - 28	35 : 1857 : 5.1 : 10.0 : 185.70		55.71			
35 - 40	2 : 2688 : 3.5 : 10.0 : 268.80		80.62			
Total or average	854 : 1243 : 5.7 : 10.2 : 121.86		37.31			

TRACK-LAYING TRACTORS						
20	4 : 1711 : 4.8 : 10.5 : 162.95		51.34			
25	8 : 2844 : 4.8 : 8.9 : 319.55		85.31			
39	1 : 3000 : 5.0 : 10.0 : 300.00		90.00			
50	4 : 4921 : 4.8 : 12.0 : 410.08		147.64			
Total or average	17 : 3075 : 4.8 : 10.1 : 304.46		92.26			

1/ Computed by dividing the first cost of the tractor by the estimated years of useful life.

2/ Charged at the rate of 6 percent of one-half of the first cost of the tractor.

Table 17. - Total cost per year and per 10-hour day of use for tractors of different types and sizes, Northern Great Plains, 1933 ^{1/}

GENERAL PURPOSE TRACTORS							
Size of tractor (drawbar horsepower)	Number	Hours	Annual use of tractor	Cost			
			Excluding tractor interest	Per year	Excluding interest	Per 10-hour day of use	
9 - 12	86	450	230.31	257.21	5.12	5.72	
15	4	635	312.64	343.95	4.92	5.42	
Total or average	90	458	233.83	260.93	5.11	5.70	

ORDINARY HIGH-WHEEL TRACTORS							
8 - 12	173	329	198.83	223.91	6.04	6.81	
15 - 17	471	407	338.92	377.12	8.33	9.27	
18 - 21	137	383	381.25	424.44	9.95	11.08	
22 - 25	36	484	460.77	502.45	9.52	10.38	
26 - 28	35	439	500.98	556.69	11.41	12.68	
35. - 40	2	443	544.38	625.00	12.29	14.11	
Total or average	854	392	329.08	366.39	8.39	9.35	

TRACK-LAYING TRACTORS							
20	4	617	494.78	546.12	8.02	8.85	
25	8	584	782.50	867.81	13.40	14.86	
30	1	1277	1604.20	1694.20	12.56	13.27	
50	4	1124	1866.55	2013.99	16.60	17.92	
Total or average	17	760	1019.76	1112.02	13.42	14.63	

^{1/} Based on normal consumption of fuel, oils, and grease at prices paid in 1933, normal outlay for cash repairs, normal days of labor on repairs, at 1933 rates for labor. Depreciation was computed by dividing the first cost of the tractor by the estimated years of useful life. Interest was charged at 6 percent of one-half of the average first cost of the tractor.

Table 18. - Motor fuels and cylinder oil consumed by tractors of different types and sizes, Pacific Northwest 1/

ORDINARY HIGH-WHEEL TRACTORS

		Gasoline 2/	Distillate 2/	Total motor fuel 2/	Cylinder oil	
Size of tractor (drawbar horsepower):	Tractors:	Per tractor per year	Per tractor per year	Per tractor per year	Per tractor per 10- hour day of use	Per tractor per 10- hour day of use
10	8	276	46	322	17.3	11.2
15	23	988	117	1105	27.5	39.4
18	4	1600	.	1600	31.1	43.2
20	1	2610	.	2610	32.5	80.0
22	3	1410	.	1410	34.4	33.3
26	2	810	.	810	36.2	17.5
Total or average	41	971	74	1045	28.0	33.8
						.87

TRACK-LAYING TRACTORS

20	19	1106	.	1106	21.3	36.6	.70
25	71	2140	.	2140	31.9	70.1	1.04
39	9	2709	.	2709	37.9	79.8	1.12
50	23	3897	.	3897	55.4	100.5	1.43
Total or average	122	2352	.	2352	35.8	71.3	1.09

1/ Based on normal consumption of motor fuels and cylinder oil.

2/ Average of all tractors.

Table 19. - Cost of motor fuels and lubricants consumed by tractors of different types and sizes, Pacific Northwest 1/

ORDINARY HIGH-WHEEL TRACTORS

Size of tractor (drawbar horsepower)	Gasoline		Distilled motor fuels		Total		Cylinder oil		Other oils and grease	
	Per tractor	Per year	Per tractor	Per year	Per tractor	Per 10-hour day of use	Per tractor	Per 10-hour day of use	Per tractor	Per 10-hour day of use
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
10	38.50	3.64	42.14	2.27	7.47	.40	3.35	.18		
15	147.66	9.46	157.12	3.91	20.62	.51	9.65	.24		
18	279.54		279.54	5.43	30.20	.59	12.89	.25		
20	365.40		365.40	4.55	38.40	.48	20.08	.25		
22	224.07		224.07	5.47	19.73	.48	10.66	.26		
26	139.12		139.12	6.21	13.58	.60	6.06	.27		
Total or average	149.71	6.02	155.73	4.18	19.01	.51	8.89	.24		

TRACK-LAVING TRACTORS

20	169.32		169.32	3.26	22.90	.44	52.00	1.00		
25	333.19		333.19	4.07	40.75	.61	74.06	1.10		
39	431.85		431.85	6.04	54.60	.76	82.23	1.15		
50	570.59		570.59	8.12	60.00	.85	91.42	1.30		
Total or average	359.70		359.70	5.47	42.62	.65	74.24	1.13		

1/ Based on normal consumption of motor fuels and lubricants at prices paid in 1933.

2/ Average of all tractors.

Table 20. - Cost of cash repairs and labor on repairs for tractors of different types and sizes, Pacific Northwest

ORDINARY HIGH-WHEEL TRACTORS										
Size of tractor (drawbar horsepower)	Farm labor on repairs									
	Tractors	Reports	tractor	Reports	tractor	Reports	tractor	Hired	Cost	3/
			Per		Per		Per	Per	Per	
			per		per		per	per	per	
			year		year	2/	year	2/	year	2/
	Number	Number	Dollars	Number	Days	Number	Days		Dollars	
10	8	8	15.62	.7	9.1	2	1.9		19.18	
15	23	23	41.30	20	3.7	4	.5		9.51	
18	4	4	26.25	.3	3.0	2	1.0		9.38	
20	1	1	100.00	1	5.0	1	5.0		22.50	
22	3	3	75.00	3	2.7	-	-		6.50	
26	2	2	62.50	2	1.0	-	-		2.38	
Total or average	41	41	39.76	36	4.5	9	.9		11.13	

TRACK-LAYING TRACTORS										
20	19	19	77.37	19	3.4	5	.6		10.46	
25	71	71	107.65	61	6.0	19	1.3		16.93	
39	9	9	76.11	9	5.2	-	-		12.61	
50	23	23	166.50	20	10.7	4	1.6		27.96	
Total or average	122	122	111.70	109	6.4	28	1.3		17.68	

1/ Normal cash outlay for new parts and skilled labor on repairs in machine shops.

2/ Average of all tractors.

3/ Represents the value of the normal time spent on tractor repair work at 1933 rates for labor.

Table 21. - Average first cost, age in 1933, years of useful life, depreciation and interest charges for tractors of different types and sizes, Pacific Northwest

ORDINARY HIGH-WHEEL TRACTORS

Size of tractor: (Drawbar horsepower)	Tractors	Average first cost	Average age in 1933	Useful life	Depreciation per tractor per year 1/	Interest per tractor per year 2/
	Number	Dollars	Years	Years	Dollars	Dollars
10	8	1272	8.9	14.0	90.90	38.16
15	23	1305	4.8	9.4	138.72	39.15
18	4	1550	5.5	10.2	151.96	46.50
20	1	1450	4.0	8.0	181.31	43.50
22	3	1513	4.3	9.3	162.69	45.40
26	2	1718	2.5	8.0	214.75	51.52
Total or average	41	1361	5.5	10.3	132.14	40.84

TRACK-LAVING TRACTORS

20	19	2032	4.5	9.2	220.86	60.96
25	71	2933	5.2	10.5	279.33	87.99
39	9	3086	2.5	9.2	335.43	92.58
50	23	4761	6.7	11.1	428.92	142.83
Total or average	122	3149	5.2	10.3	305.75	94.46

1/ Computed by dividing the first cost of the tractor by the estimated years of useful life.

2/ Charged at the rate of 6 percent of one-half of the first cost of the tractor.

Table 22. - Total cost per year and per 10-hour day of use for tractors of different types and sizes, Pacific Northwest, 1933 1/

ORDINARY HIGH-WHEEL TRACTORS

Size of tractor (drawbar horsepower)	Tractors	Cost					
		Annual	Per year	Per 10-hour day of use	Excluding	Including	Excluding
		use of	tractor	interest	interest	interest	interest
		Number	Hours	Dollars	Dollars	Dollars	Dollars
10	8	186	178.66	216.82	9.60	11.65	
15	23	402	376.92	416.07	9.38	10.35	
18	4	515	510.22	556.72	9.95	10.81	
20	1	803	727.69	771.19	9.06	9.60	
22	3	410	498.65	544.05	12.16	13.27	
26	2	224	438.39	489.91	19.57	21.87	
Total or average	41	373	366.66	407.50	9.83	10.92	

TRACK-LAYING TRACTORS

20	19	520	552.91	613.87	10.63	11.80
25	71	671	851.91	939.90	12.70	14.00
39	9	715	992.83	1085.41	13.89	15.18
50	23	703	1345.39	1488.22	19.14	21.17
Total or average	122	657	911.67	1006.13	13.88	15.31

1/ Based on normal consumption of fuels and lubricants, at prices paid in 1933, normal outlay for cash repairs, and normal days of labor on repairs, at 1933 rates for labor. Depreciation was computed by dividing the first cost of the tractor by the estimated years of useful life. Interest was charged at 6 percent of one-half of the average first cost of the tractor.

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